

the use of tuberculin, vaccine therapy in general and the principles upon which it is based, and the employment of salvarsan.

Over a quarter of a century of continuous activity as clinician, investigator, and medical teacher has enabled the author to appreciate with unusual clearness the needs of the practitioner. As a consequence, in the present edition of his book, Hare has so skilfully correlated the results of laboratory investigations with clinical observations that we know of no other book in which the relationship between the scientific and practical aspects of therapeutics is made so clear or to which the physician at the bedside may turn with greater assurance of finding the help which he seeks.

G. M. P.

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MANUAL OF HUMAN EMBRYOLOGY. By Fifteen Writers. Edited by FRANZ KEIBEL, Professor in the University of Freiburg, and FRANKLIN P. MALL, Professor of Anatomy in the Johns Hopkins University, Baltimore. Volume II. Pp. 1032; 658 illustrations. Philadelphia and London: J. B. Lippincott Company, 1912.

An important stage in the progress of the science of human embryology is marked off by the appearance of Keibel and Mall's work, the second volume of which is now before us. The attitude of one of the editors (Professor Mall) toward his subject is thus expressed in a recent article. "Gross anatomy as a science is bankrupt. It is made solvent through embryology which alone illuminates it." And, again, "a great field opens to us for the study of histogenesis which binds embryology to histology, to make the foundation for scientific anatomy." When such is the enthusiastic point of view, the result cannot fail to be a notable production. The work is complete in two volumes and has appeared at the same time in an English and a German edition. It is also international in character in the personnel of the contributors, for of these six are European and nine are American. The first volume was published in 1910 and the present one in 1912. The plan of the work is on the "Handbuch" type, inasmuch as small subdivisions of the subject are treated by different authors, each of whom has special knowledge of the field of which he writes.

The present volume contains seven chapters numbered XIV to XX. The development of the nervous system (Chapter XIV) is considered under the four headings: (1) histogenesis of nervous tissue; (2) development of central nervous system; (3) of peripheral nervous system, and (4) of sympathetic nervous system. Chapter XV treats of the chromaffin organs and the suprarenal body, of which only the medulla is formed of chromaffin tissue. This tissue is described as secreting a substance which produces contraction of the non-striped musculature, and especially serves to maintain

blood pressure and vascular tonus at corresponding levels. The largest of the separate chromaffin organs are the aortic bodies (of Zuckerhandl), which measure in the newborn child, 11.6 mm. on the right side and 8.8 mm. on the left side. They are situated laterally to the aorta, near its point of bifurcation. Their size becomes less in post-fetal life but they do not actually disappear. Chapter XVI describes the development of the sense organs and Chapter XVII the digestive tract and the organs of respiration. In Chapter XVIII, are included the blood, the vascular system, and the spleen. Professor Minot, in his description of blood, considers that red and white blood corpuscles have the same origin, or in other words, arise monophyletically, and in this he is in agreement with a number of recent investigators. The primitive cells from which all are derived he terms "mesameboids," and some of the descendants of these continue throughout life to have the same embryonic character, and so to serve as the source of the new blood cells. Since they can move freely they can alter their distribution in the body. At one period of fetal life they are in the liver and lymphoid organs, but finally, they migrate into the marrow of bones, and thenceforth this serves as the permanent site of blood formation. He adds, however, that this view is not secure beyond all doubt. All leukocytes, accordingly, have a unitary origin also, and Minot thinks that they develop from the primitive mesameboids, but admits that investigators are divided on this point. The other view is that free wandering cells (leukoblasts) arise directly from mesenchymal cells. Four principal classes of leukocytes are recognized: I. Young forms without granules (lymphocytes); II. older forms with granules—(a) finely granular (neutrophile of Ehrlich); (b) coarsely granular (eosinophile of Ehrlich); (c) degenerating (basophile of Ehrlich). Of these the finely granular leukocytes represent the chief developmental series of the white corpuscles. The blood vascular system by Dr. H. M. Evans, is based, for the most part, on the beautiful series of injected specimens of young embryos, which he has himself prepared. In the consideration of the lymphatic system, Professor Sabin clearly defends her view that the lymphatic system arises from veins, and that the lymphatics grow out by the sprouting of the endothelium of preceding vessels. In Chapter XIX there is a comprehensive account of the urinogenital organs, and the final chapter is devoted to a short account of the interdependence of the various developmental processes.

Throughout the authors have presented the results of numerous investigators with careful judgment, and these have been verified and supplemented by much original work. The result is a repository of knowledge on human embryology, which must be of the greatest value to every student of the science, and which will undoubtedly serve as the starting point for many new researches.

W. H. F. A.